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(with four plates)

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P. A. D. Hollom E. M. Nicholson
I. J. Ferguson-Lees Stanley Cramp

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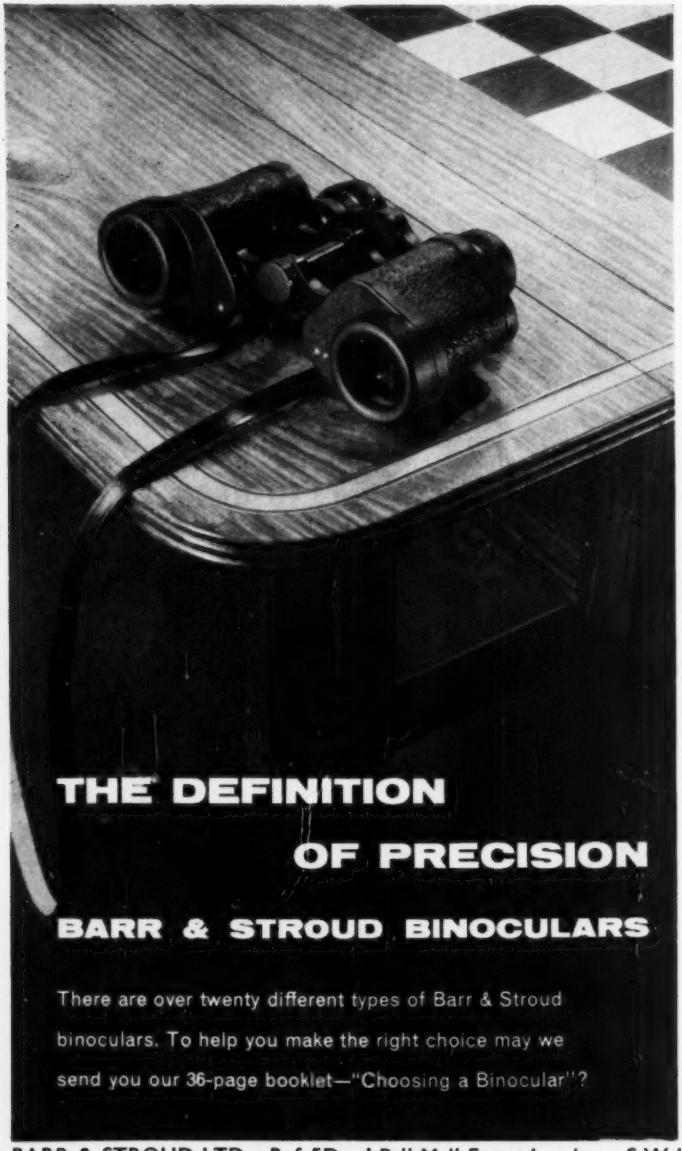
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British Birds

Vol. 54 No. 8

AUGUST 1961

Conservation and predation problems of birds of prey in Sweden

By Kai Curry-Lindahl

Zoological Department, Nordiska Museet and Skansen, Stockholm

INTRODUCTION

TO ALL APPEARANCES, the effect which birds of prey have on their quarry is simple. They kill and devour other animals. Through the centuries man has observed this and has generalised from it. If the animal killed has been considered "useful", the predator has immediately been labelled "noxious". Consequently, man has generally attempted to cut down birds of prey in order to increase his stocks of game. This killing has sometimes been successful, sometimes not. But, as a rule, the trouble taken has been wasted, for there seems to have been little or no positive effect on the "useful" animals.

In Sweden raptorial birds were long considered a nuisance and could be killed throughout the year. As a result they were almost exterminated. Protection then began because it was scientifically interesting to preserve these species, and because it was felt that they belonged by tradition to the country's fauna. Today we have come to the conclusion that birds of prey must be protected not only for their beauty and scientific value but, above all, for biological reasons. Research work on different species of raptors has shown us that they are an important part of a biotic community, and that their influence in reducing the numbers of game species is usually negligible.

The first birds of prey to be protected in Sweden throughout the year were the Kite (*Milvus milvus*), the Marsh Harrier (*Circus aeruginosus*) and the Hen Harrier (*C. cyaneus*). This was as long ago as 1919. Then, in 1924, protection was extended to the Golden Eagle (*Aquila chrysaëtos*) and the White-tailed Eagle (*Haliaëtus albicilla*), and later to all eagles, harriers and kites. In Sweden this meant that all species of the genera *Aquila, Haliaëtus, Circaëtus, Circus* and *Milvus* appearing in

the country were automatically protected by law throughout the year. During the 1950's the Honey Buzzard (*Pernis apivorus*), the Osprey (*Pandion haliaëtus*) and all species of the genus *Falco* were added to the list and these birds now receive total protection. In addition, all buzzards (*Buteo* sp.) and the Goshawk (*Accipiter gentilis*) are now protected from 1st April to 31st August. Only the Sparrowhawk (*A. nisus*) may still be killed throughout the year.

No other raptor in Sweden has caused so much controversy as the Goshawk. As a result of intensive campaigns by hunters to exterminate it, the species had decreased tremendously and become very rare in southern and central Sweden before a close season from 1st March to 31st August was established. The breeding period was thus covered fairly well, but pressure from the hunters later reduced this close season by a month, so that the species may now be killed in March. This is very unfortunate, because Goshawks in Sweden are particularly vulnerable to human predation then. They are just starting their nesting activities and on early March mornings the breeding pairs loudly announce their presence in the forests. This reveals the positions of their nests, where they can easily be shot.

Conservationists in Sweden are now aiming at full protection for all species of buzzard, renewed protection for the Goshawk in March, and protection of the Sparrowhawk during the breeding season. The last step is not necessary for the Sparrowhawk's own sake because it maintains its numbers fairly well, but it would save other birds of prey from being shot "by mistake".

Legislative measures alone are not sufficient to preserve the biological rôle of birds of prey, however, and it is very important to avoid classifying them into "harmful" and "useful" species. Their ecology and function in biotic communities cannot be thoroughly understood without detailed studies of their necessities, the nutritional value of their different food items, their metabolism, the food consumption of different species in various habitats in all the seasons of the year, their hunting techniques and their choices of prey, as well as predator-prey relationships, population dynamics and cycles, and so on.

At present not very much is known about these topics, though a considerable amount of material has been accumulated in various countries, including Fenno-Scandia. In a separate paper Göran Bergman gives brief summaries of what is known about the food habits of Fenno-Scandian raptors and owls, and in a future issue J. F. Willgohs and Thorvald Lindquist will deal respectively with the White-tailed Eagle and with the problem of Peregrines (*Falco peregrinus*) and homing pigeons (*Columba*). In the present paper I propose to discuss some general questions connected with the food biology of the diurnal birds of prey in Scandinavia and Finland.

FOOD CONSUMPTION

It is essential to discover how much adult raptors eat. We know that they are capable of fasting for fairly long periods if they are in good health, and experience at zoological gardens has shown that their daily food intake is surprisingly modest. Birds of prey may reach a considerable age in captivity and there are, or have been, many very old eagles, buzzards and hawks at Skansen, the Zoological Garden of Stockholm. These have always been fed on very small quantities of food. In one large cage five Buzzards (*B. buteo*), two Goshawks, and one Rough-legged Buzzard (*B. lagopus*) are kept together. The cage is sufficiently extensive and high to allow the birds to fly about, and a number of trees and bushes grow in it. During the week 12th-18th October 1959 we weighed all food items presented to these birds, and afterwards carefully collected and weighed any remnants. The average food intake per bird per day was exactly 170 gm., or about six ounces. By comparison, Uttendörfer (1952) gives a daily average of 150 gm. for adult Buzzards and adds that the average for a young Buzzard during the whole nest period was 75 gm. per day. The Heinroths (1928) mention that a Goshawk nestling about two weeks old consumed 160 gm. of pure meat as a daily average.

Wild birds probably use somewhat more energy and require more protein than birds in captivity. However, except during migrational and reproductional activities, birds of prey are in general very little on the move. Eagles, buzzards and harriers hunt in a way that does not need any great muscular effort. They soar and glide with very little wing and tail movement, sometimes looking for prey, at other times flying around apparently without special purpose. Such habits can hardly necessitate large quantities of food.

Although I am not able to produce statistical data to show the average food intake of a particular individual of any species of bird of prey, I have a strong impression from my field studies in Sweden that at least eagles, buzzards and harriers need much less food than is generally believed. This was confirmed by a year's observations in tropical Africa, where it is easier to follow the daily routine of birds of prey living on savannas. The same may also apply to other groups of raptorial birds, such as hawks and falcons, but it is much more difficult to observe the daily activities of particular individuals of these species.

Mammalian carnivores of various sizes, especially the larger members of the cat family (Felidae), do not need a meal every day. When they have killed they may eat enormously, but afterwards they often fast for several days, during which time they are completely indifferent

to their prey species, even when these appear in their immediate vicinity. As already stated, birds of prey are able to fast for fairly long periods and it is likely that they are governed by similar physiological rules.

INDIVIDUAL SPECIALISATION

Another important aspect of the food biology of raptors is individual specialisation on particular prey species. It is dangerous to assume that long series of food items from a particular nest are necessarily representative of the prey of the species as a whole. In the case of the Goshawk, for instance, neighbouring pairs living in the same habitats may have quite different food habits. I have data from two such nests about a mile apart. At one the male brought mostly Woodpigeons (*Columba palumbus*) and Black-headed Gulls (*Larus ridibundus*), while at the other the most common food was Jays (*Garrulus glandarius*).

This different food specialisation among individuals of the same species is certainly of survival value because the intraspecific competition is thus less pronounced and the ecological range extended. Probably such individual specialisation evolves accidentally during the early part of the bird's life. Successful hunting of a particular species may cause the young bird to turn especially to this prey. According to Thorpe (1959), there is no need to suppose that birds have an innately organised receptive mechanism which determines that they shall respond to one type of food or another. The following quotation from this author was originally used with reference to individuals of different species, but in some cases, e.g. Goshawks, may equally well be applied to individuals of the same species: ". . . much evidence now goes to show that from amongst foods equally available and nutritious, birds will tend to prefer those foods with which they can most effectively deal in a given time with the kind of bill and foot mechanism with which they are equipped". There are, however, other cases, even among Goshawks, where no specialisation occurs at all. Such individuals bring a variety of different food items, including both mammals and birds, to the nest.

The specialisation of particular individuals does not mean that they do not shift over to other food when their favourite prey species becomes rare or seasonally disappears from the area. In general, one may say that it is the availability of prey that governs the predator's choice. This is shown by the habit of shifting between different prey species according to their frequency, a phenomenon which is known in all Fenno-Scandian flesh-eating raptors and probably also holds good for insect-eating species. This capacity of shifting from one kind of prey to another is important for migratory species, especially for those which spend the winter in the tropics. Holstein (1950) has shown that

nesting Sparrowhawks in Denmark adapt their predation to the varying abundance of different Passerines during the short period of their passage on spring migration through the territory. However, there are also raptorial birds that feed almost exclusively throughout the year on a very few prey species. The Gyr Falcon (*Falco rusticolus*) is an example of this (Hagen 1952b), as can be seen from Bergman's paper which follows.

Most Fenno-Scandian raptors fall between the two extremes of specialised and catholic feeding. Thus most species concentrate on rather fewer categories of prey than are available to them.

PREDATION ON DOMESTIC ANIMALS

In Sweden only a few species of raptorial birds are known to prey on domestic animals and even they cannot be considered to affect such livestock seriously.

Golden Eagles may prey on young sheep, goats and Reindeer (*Rangifer tarandus*), which in Sweden live in a semi-wild state, and dogs and cats also occasionally fall victim to them. Predation on domestic animals by this species seems, however, to be rather rare, though, of course, it regularly takes care of the dead Reindeer that are fairly common in the mountains. This has caused the Lapps to accuse the Golden Eagle of extensive killing of adult Reindeer as well. Apparently Golden Eagles take carrion even when live food is available.

Some Goshawks prey on poultry, and individual Sparrowhawks sometimes also specialise on chickens.

PREY SELECTION AND PREDATOR-PREY RELATIONSHIPS

Another important part of the predation problem concerns the choice of the individual victim. Does a raptor attack a particular bird or does it take its prey at random? There are many records which indicate that hunting predators react to animals with physical defects. Such animals are more vulnerable and apparently induce attack, which very often ends in death for them. This means that raptorial species have a selective effect through their choice of prey.

To determine whether such a selection occurs, it is necessary to see how the attack is made and in some cases also to be able to examine the dead victim. Although we have small chance of carrying out such observations very often, there is so much evidence of selection of injured and abnormal prey that it is unlikely that the choice could always have been made merely by accident.

In Sweden a selective effect by raptorial birds has been recorded as occurring in four species, namely the Sparrowhawk, White-tailed Eagle, Peregrine and Merlin (*F. columbarius*) (Durango 1948, Rudebeck 1950-51). To these may be added unpublished Swedish observations

of my own for the Sparrowhawk, Buzzard, Rough-legged Buzzard and Golden Eagle.

Rudebeck's studies are of especial value, because he was often able to follow the hunting in detail from beginning to end, and could sometimes also examine the prey after it had been killed. No less than 33.3% of the prey obtained in successful hunts by White-tailed Eagles consisted of cases in which he noted injury, abnormality or abnormal behaviour in the victim. For the Sparrowhawk the minimum percentage was 21.7, for the Peregrine 15.8 and the Merlin 14.3.

The records of both Durango and Rudebeck refer to avian prey only. In my own fragmentary observations on the choice of victim by Buzzards and Golden Eagles, mammalian prey is also involved. Twice I have observed a Buzzard taking injured prey. When I was investigating the relationship between Tawny Owls (*Strix aluco*) and small mammals in southern Sweden (Curry-Lindahl 1956, 1959), it sometimes happened that trapped Bank Voles (*Clethrionomys glareolus*) were injured by the traps. On 14th May 1945, at about 2.50 a.m., I found a Bank Vole that had one of its hind legs jammed by a trap. I released it on the spot, in a small clearing of mixed forest; it could move fairly well without using the injured leg, which was broken. To my astonishment this vole did not seek cover. It moved around, apparently in search of food, which it found here and there. I lost sight of it when I entered the hide I had set up for watching the Tawny Owls. I could see, however, that other Bank Voles were moving about in the skulking way so characteristic of this semi-diurnal and diurnal species. At about 4.45 a.m. a Buzzard came to the clearing and alighted on a Norway spruce. Some ten minutes later it flew down to the ground and apparently seized something. At this moment I left the hide. The Buzzard took wing, letting an object fall as it did so. Half a minute later I found its prey—my injured Bank Vole, still showing signs of life though it died within thirty seconds. My second observation of a Buzzard taking defective prey is less significant. On 6th June 1949 I found a trap containing the remains of a Bank Vole in the nest of a Buzzard. The bird had thus caught the vole when it was either dead or injured.

I have only one personal example of prey selection by a Golden Eagle, but it is a very convincing one. On 23rd June 1959 I was working on the southern slopes of the Tuipe mountain, situated between the lakes Satisjaure and Vuolep Kaitumjaure in Swedish Lapland. Scattered herds of Reindeer were migrating to higher levels, following a very abrupt increase in temperature. A Golden Eagle appeared, soaring high above the slopes, and apparently became interested in the Reindeer, for it started to circle above them. The bird concentrated on a particular herd of about two hundred, of which

some sixty were calves of different sizes. Gradually the Golden Eagle descended, still circling over the Reindeer which did not seem to be worried by it. Among the calves I had observed one that from time to time did not use its left foreleg. Suddenly the eagle came down very rapidly (though not actually stooping) until it was within thirty or forty yards of the ground and about three hundred yards from the herd, towards which it then flew with rather slow wing-beats. Just before it reached the Reindeer, they started to run in what looked like a panic, scattering in different directions, and the calves lost contact with their mothers. Without any hesitation the eagle pursued the injured calf, seized it with both feet and pecked it on the head. Almost immediately the calf tumbled down with the eagle on it, kicked out several times and then lay motionless. The whole action took less than thirty seconds. The eagle did not start eating its kill at once, but first just perched on its victim and looked around. Another Golden Eagle appeared, joined the first on the prey and both then soon started to eat.

My observation of a Rough-legged Buzzard took place in the Sarek National Park in Swedish Lapland. I had had a Fieldfare (*Turdus pilaris*) under observation there for several days. It was behaving quite abnormally and had difficulty in balancing when it perched on branches or hopped on the ground. There did not seem to be anything unusual about its flight, however. This particular Fieldfare was grabbed by a Rough-legged Buzzard just as it and several others took wing together from a meadow where they had been feeding.

On four occasions I have witnessed Sparrowhawks seizing Passerine birds that had physical defects. Two involved Blackbirds (*T. merula*), one a House Sparrow (*Passer domesticus*) and one a Tree Sparrow (*P. montanus*). In both the cases when an injured sparrow was the victim, the birds were in flocks.

In tropical Africa I have had many more opportunities of collecting data on the selective effects of hunting by birds of prey, but that would be beyond the scope of this short paper.

Reverting to Sweden, it is relevant to describe how Black Grouse (*Lyrurus tetrix*) used to be and sometimes still are hunted in winter when they feed on birch buds. The hunters used dummy Black Grouse which were placed high in the birches to attract flying flocks of these birds. This method worked rather well, but from time to time it would happen that a Goshawk detected the flock of Black Grouse before the hunters had had time to shoot and it was generally recognized that in such circumstances the Goshawk usually charged the dummy rather than the live birds. Sometimes the hawk had difficulty in freeing itself from the stuffing of the dummy and was shot before it could escape, but the grouse were thus saved!

In his fine work on wildlife conservation, Gabrielson (1947) states that there is not much definite evidence that predators render a useful service to game species in thus destroying sick and weak animals, thereby helping them to maintain the vigour of the stock. I think, however, that one is justified in concluding that raptorial birds do sometimes actually select physically unfit prey. There is still no scientific evidence to suggest that predators do not fulfil a useful rôle. Such observations as those I have described above convince me that the destruction of animals that prey upon game birds may not only fail to promote the welfare of these species but may even be harmful to them. Nevertheless, we need much more research work in this field before the significance of predation, one way or the other, can be objectively estimated.

Predator-prey relationships are only one of the several factors which regulate animal populations (*cf.* Elton 1942; Errington 1946, 1956; Chitty 1957; Frank 1957; Darling 1959). Indeed, they are probably far from being among the most important. Food shortages, and the resultant intraspecific competition, are one of the most significant regulating factors. Rapid crashes in populations seem often to be caused by endocrinological and other internal phenomena.

Fluctuations in the numbers of avian predators are generally closely correlated with similar variations in the populations of their prey species. Clutch-size increases, the breeding range extends and so on. This is especially pronounced in certain owls and the Rough-legged Buzzard—though, except in a few areas, the latter quite unexpectedly failed to respond to the peak population of Lemmings (*Lemmus lemmus*) in Sweden in 1960 and 1961. It would go far beyond the limits of this short paper to discuss this interesting aspect of ecology, but there are many data from northern Fenno-Scandia to show the relationship between population peaks of prey and predators and I would particularly refer the reader to the following works which give examples from this area: Ekman (1907, 1922, 1944), Rosenberg (1945), Swanberg (1946), Larson (1947), Siivonen (1948, 1950), Kalela (1951, 1954), Barth (1952), Hagen (1952a, 1952b, 1953), Hagen and Barth (1952), Holstein (1956), Curry-Lindahl (1958, 1961).

TERRITORIALITY IN BIRDS OF PREY

Most Swedish birds of prey are generally territorial. The pairs of such species as the Golden Eagle, White-tailed Eagle and Goshawk may shift between several different nest-sites from year to year, but these are usually within the same territory. The birds mainly feed, roost and display inside the territory, the size of which varies according to the availability of food, nest-sites and cover. Ospreys are much less territorial than other birds of prey, however. Their nests are some-

times so concentrated as to form colonies. Several breeding pairs may also regularly and simultaneously fish in a restricted area of the same lake without fighting. Different pairs of Hobbies similarly share feeding areas during the breeding season, particularly when there are concentrations of dragonflies or other insects over reed-beds.

SUMMARY

(1) This paper is the first in a series of four concerning birds of prey in Scandinavia and Finland.

(2) In Sweden all species of *Aquila, Haliaëtus, Circaëtus, Circus, Milvus, Pandion* and *Pernis* (eagles, harriers, kites, Osprey and Honey Buzzard) are protected throughout the year. All buzzards (*Buteo* sp.) are protected from 1st March to 31st August, and the Goshawk (*Accipiter gentilis*) from 1st April to 31st August, though the Sparrowhawk (*A. nisus*) may be killed throughout the year. However, legislative measures alone are not sufficient to preserve birds of prey effectively.

(3) The daily food intake of birds of prey is low. The average food consumption per day per bird for five Buzzards (*Buteo buteo*), two Goshawks and one Rough-legged Buzzard (*B. lagopus*) kept together in captivity was exactly 170 gm. In the wild state, at least eagles, buzzards and harriers need much less food than is generally believed.

(4) Individual and specific food specialisations are discussed. Two Goshawks nesting a mile apart from each other preyed on different kinds of birds. One specialised on Woodpigeons (*Columba palumbus*) and Black-headed Gulls (*Larus ridibundus*), the other on Jays (*Garrulus glandarius*). It is suggested that individual specialisation evolves accidentally during the early part of the bird's life.

(5) Food specialisation does not prevent predators from changing over to other foods if the favourite prey becomes rare. In general, it is the availability of prey that governs the predator's choice.

(6) The selective effect of raptorial birds is discussed, and some new data of selective predation by Buzzard, Golden Eagle (*Aquila chrysaëtos*), Rough-legged Buzzard and Sparrowhawk are presented.

(7) Predator-prey relationships and fluctuations in number of avian predators and prey species are commented upon.

(8) Most Swedish birds of prey are territorial. Nests of Ospreys (*Pandion haliaëtus*) are sometimes so concentrated as to form colonies. Several pairs of these birds may simultaneously fish in a restricted area of a lake without showing any aggressiveness towards each other.

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The food of birds of prey and owls in Fenno-Scandia

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THIS PAPER is a brief summary of the information that is available in the Scandinavian and Finnish ornithological literature on the food of the diurnal birds of prey and the owls. The diet of some species has been relatively well investigated, but that of others is little known and the picture is obscured by many not very objective discussions as to whether raptors are destructive to game.

Food summaries of this kind can be misleading for any of several reasons and these should be borne in mind. The tendency of individuals of some species to specialise on a few kinds of prey means that the food remains at just one or two nests may not be representative of the species as a whole. At the same time the climate, ecology and fauna vary considerably in different parts of Fenno-Scandia and this affects the availability of food. Cultivated areas and forests predominate in the south, while there are large regions of bare mountains in the west and north. In Finland and the northern half of Sweden there are vast tracts of coniferous forest and more than 150,000 lakes. To all this must be added the special conditions found in the archipelagos along the coasts of southern Finland, eastern Sweden and Norway. Finally, it must be remembered that many records of the food of raptors are based on food remains without any allowance for the fact that some prey species leave much more recognisable remains than others.

The food percentages given in this paper (mostly rounded to the nearest whole number and so not necessarily totalling exactly 100) are throughout by number and not by weight.

Golden Eagle (*Aquila chrysaëtos*)

Recent studies by Sulkava (1959b) in Finland and the Norwegian records published by Hagen (1952) give a picture of the diet of the Golden Eagle in Fenno-Scandia, though the question of the amount of carrion taken by this species has not yet been fully cleared up. There is evidence that in Lapland especially the Golden Eagle lives to a considerable extent on dead Reindeer (*Rangifer tarandus*) in winter, and on dead Reindeer calves in spring. Since wild Reindeer have been exterminated in Finland, Sweden and most of Norway, and since the

Wolf (*Canis lupus*) and the Wolverine (*Gulo gulo*) have been almost wiped out, the chances of finding dead animals is practically restricted to the area of Reindeer breeding. This may be the main reason why the Golden Eagle population seems now to maintain itself only in the far north and in the mountains.

Sulkava collected 99 fresh remains at 12 nests in Finland in 1958, all in the coniferous forest. The following are the percentages:

Capercaillie (*Tetrao urogallus*)	33%
Blue Hare (*Lepus timidus*)	23
Grouse (*Lyrurus, Lagopus*)	22
Crane (*Megalornis grus*)	3
Other birds	9
Other mammals	9

The smallest birds were thrushes (*Turdus*) and Cuckoos (*Cuculus canorus*), and the smallest mammals Red Squirrels (*Sciurus vulgaris*) and vole rats (*Arvicola*). The majority of the Capercaillie and Black Grouse (*Lyrurus tetrix*) were adult females. Even grey geese (*Anser*) and Whooper Swans (*Cygnus cygnus*) are on the food list in Finland.

Hagen's Norwegian analysis was based on food remains, pellets and intestinal contents. The percentages on the 137 prey items he lists are:

Blue Hare (*Lepus timidus*)	28%
Grouse (*Lagopus*)	26
Capercaillie (*Tetrao urogallus*), Black Grouse (*Lyrurus tetrix*)	12
Arctic Fox (*Alopex lagopus*)	4
Lamb/Kid (*Ovis/Capra*)	4
Fox (*Vulpes vulpes*)	3
Young Reindeer (*Rangifer tarandus*)	1
Carrion of these four mammals	9
Unidentified carrion	2
Other mammals	4
Other birds	4

The prey included two small rodents (*Arvicola, Lemmus*), a Cat (*Felis catus*) and a Lump-sucker (*Cyclopterus lumpus*).

Buzzard (*Buteo buteo*)

The diet of the subspecies *vulpinus*, a bird typical of coniferous forests, was investigated by Suomus (1952) in a small locality in Finland. In the four summers from 1949 to 1952 the total number of food animals he actually saw brought to the nest was 358, including the following:

Small mammals	54.0%
Frogs	20.6
Birds	13.5
Lizards, blindworms, snakes, etc.	5.5
Hare (*Lepus*), Squirrel (*Sciurus*)	0.5
Not identified	5.8

These percentages are misleading on their own, however, partly because they do not show the changing proportions from year to year which reflected fluctuations in the populations of the food animals, and partly because the remains in the nest were rather different from the prey he saw brought to it. The annual variation in the vole population during the four years could be indicated by the ratios 20:6:3:4, and the corresponding percentages of voles in the diet were 69, 37, 13, and 30. Of the food remains in the nests, 27% were grouse, though these birds formed only 5% of the food which he actually saw brought to the nest. Similarly, 9% of the food remains consisted of Jays (*Garrulus glandarius*), though he never saw a single Jay being carried. All the birds brought to the nests were young.

Rough-legged Buzzard (*Buteo lagopus*)

At least in the breeding area, this species feeds very largely on small rodents. Investigations in Sweden have shown that these animals form over 90% of the diet there, and in Norway about 85%. Hagen (1952) listed 2,114 items of vertebrate prey and these may be summarised:

Small rodents	85%
Other mammals	3
Grouse (*Lagopus*)	5
Small Passerines	2
Black Grouse (*Lyrurus tetrix*), Capercaillie (*Tetrao urogallus*)	1
Other and unidentified birds	3

The vertebrate prey included a few frogs and fish and there were also numbers of insects. The mammals were mainly Stoats (*Mustela erminea*), young hares (*Lepus*) and shrews (*Sorex*). The birds, which totalled about 11%, even included some waders, ducks, birds of prey and owls.

Sparrowhawk (*Accipiter nisus*)

The Sparrowhawk typically catches small Passerines up to the size of thrushes, but it also takes a few other birds as large as Magpie (*Pica pica*), Cuckoo (*Cuculus canorus*) and Woodcock (*Scolopax rusticola*). There are also a very few reports of its preying on young game-birds. Hagen (1952) listed 506 prey items which may be summarised as follows:

Small Passerines	79%
Unidentified small birds	12
Other birds	5
Small mammals	5

The following birds showed the highest numbers: Fieldfare (*Turdus pilaris*) 68 and other thrushes (*Turdus* sp.) 111, pipits (*Anthus*) 40,

Brambling/Chaffinch (*Fringilla montifringilla/coelebs*) 25, Reed Bunting (*Emberiza schoeniclus*) 19, Willow Warbler (*Phylloscopus trochilus*) 18, Redstart (*Phoenicurus phoenicurus*) 18 and Wheatear (*Oenanthe oenanthe*) 18. Only three young Capercaillie (*Tetrao urogallus*) or Black Grouse (*Lyrurus tetrix*) were found, and only one young *Lagopus*.

The damage done by Sparrowhawks to game is of little significance in Norway and most of Finland, but wintering individuals in the southernmost part of Finland, in southern Sweden and in Denmark may prey on game birds, especially Partridges (*Perdix perdix*), to some extent. However, this seems to be done only by a small proportion of females with specialised tastes. Incidentally, the statement by Nordberg (1935) that Sparrowhawks on migration catch more birds with some red on their plumage does not seem to me to be satisfactorily proved.

Goshawk (*Accipiter gentilis*)

Sulkava (1956) made a careful study of the diet of ten pairs of Goshawks in the breeding season in Finland, based partly on direct observations at the nest. The results seem to be representative of the food of this species in the coniferous forests of Fenno-Scandia. Other notable investigations were published by Holstein (1942) in Denmark and Hagen (1952) in Norway. It is evident that in different localities the Goshawk preys on widely different species, the main ones in some areas being "valuable". Capercaillie (*Tetrao urogallus*), Black Grouse (*Lyrurus tetrix*) and even Red Squirrels (*Sciurus vulgaris*) are much taken in the forests, Willow Grouse (*Lagopus lagopus*) and Ptarmigan (*L. mutus*) in moorland and mountains, and hares (*Lepus*) in all parts of Fenno-Scandia.

Sulkava's Finnish figures, based on 253 food items in the breeding season, were:

	1949-54 average	1955
Grouse (Tetraonidae)	74%	36%
Crows (Corvidae)	7	4
Red Squirrel (*Sciurus vulgaris*)	6	46
Ducks (Anatidae)	3	—
Partridge (*Perdix perdix*)	3	—
Other mammals	5	3
Other birds	2	11

The different proportions of grouse and squirrels in the two periods reflect changes in their availability.

Hagen's Norwegian data, based on 101 mammal and 306 bird items over the whole year, were:

Passerines (except crows)	19%
Hill grouse (*Lagopus*)	15
Forest grouse (*Tetrao, Lyrurus*)	12
Pheasant (*Phasianus colchicus*)	9
Crows (*Corvus, Pica, Garrulus*)	5
Waders (Charadriidae, Scolopacidae)	4
Chickens (*Gallus*)	3
Other birds	8
Small mammals	10
Red Squirrel (*Sciurus vulgaris*)	9
Hares (*Lepus*)	6

A considerable proportion of thrushes and grouse were young unable to fly and the former were probably taken from nests. The other birds included Pintail (*Anas acuta*), Kestrel (*Falco tinnunculus*), Tawny Owl (*Strix aluco*) and Tengmalm's Owl (*Aegolius funereus*).

Kite (*Milvus milvus*)

Hörstadius (1928) reported the following food remains in a Swedish nest: Green Woodpecker (*Picus viridis*) one, Cuckoo (*Cuculus canorus*) one, Magpie (*Pica pica*) one, Capercaillie (*Tetrao urogallus*) one, pigeons (*Columba*) two, and fish and small rodents. This species eats considerable amounts of insects, worms, dead fish and varying kinds of refuse. It also even takes prey from other raptorial birds.

Black Kite (*Milvus migrans*)

Lundberg (1955) found the following food remains in a Swedish nest: Mallard (*Anas platyrhynchos*) one, Tufted Duck (*Aythya fuligula*) one, Curlew (*Numenius arquata*) two, thrushes (*Turdus*) several, ?Black-throated Diver (*Gavia arctica*) one pull., and Red Squirrel (*Sciurus vulgaris*) one. V. Törnroos (*in litt.*) identified the remains of a hare (*Lepus*) in a nest in Finland, where this species also eats refuse and dead fish.

White-tailed Eagle (*Haliaëtus albicilla*)*

In Norway the White-tailed Eagle seems to prey chiefly on birds, but in the Baltic area, where there are shallow coasts and archipelagos, it turns to a great extent to fish, especially Pike (*Esox lucius*) and carp (Cyprinidae). No real investigations into the diet have yet been published, but many short notes are to be found in the ornithological literature. In Norway this eagle catches both adult and young sea-birds—Cormorants and Shags (*Phalacrocorax carbo* and *aristotelis*), Little Auks (*Plautus alle*), Razorbills (*Alca torda*), Guillemots (*Uria aalge*), Eiders (*Somateria mollissima*), Long-tailed Ducks (*Clangula*

*The forthcoming paper by J. F. Willgohs (see page 298) will deal with the food of the White-tailed Eagle in greater detail.—EDS.

hyemalis) and others (Hagen 1952)—and in some regions even hares (*Lepus*). In the Baltic archipelagos the bird prey includes Eiders, Velvet Scoters (*Melanitta fusca*), Red-breasted Mergansers (*Mergus serrator*), Goosanders (*M. merganser*) and other ducks, and even young of the larger gulls (*Larus*) in the colonies (Nordberg 1950).

In Finland, in the breeding season, it eats fish (both living and dead) approximately as often as birds (adults and young), but it hardly ever takes living mammals. Contrary to what has been claimed, there is no reliable proof of its preying on sheep (*Ovis*) in Finland, but it will eat dead sheep and seals (Phocidae) if it comes across these on islands or on the ice. During the winter the White-tailed Eagle parasitises the Herring (*Clupea harengus*) fisheries on the ice in south-west Finland. At ice-holes it also preys on concentrations of Long-tailed Ducks, Goldeneye (*Bucephala clangula*) and other diving ducks (*Mergus, Aythya*). In southern Scandinavia various ducks and other waterfowl, fish, carrion and hares are among its food in winter.

Honey Buzzard (*Pernis apivorus*)

As in other countries, the Honey Buzzard feeds mainly on bees, wasps and bumble bees, and on their nests and larvae. Holstein (1944) carried out careful observations at a nest in Denmark, and the food brought to the young over a period of 53 days was made up of the following: nests of wasps (Vespidae) 64 times, frogs (Ranidae) 20, indeterminable invertebrates 53, nests of bumble bees (*Bombus* sp.) 15, small birds two, worms two, lizards one.

Marsh Harrier (*Circus aeruginosus*)

There have been no real investigations of the food of this species in Fenno-Scandia. Small rodents, the young of several kinds of water-birds—for example, Black-headed Gulls (*Larus ridibundus*), Coots (*Fulica atra*) and ducks (*Anas*)—and also frogs (Ranidae), seem to form the main prey (Hortling 1929-31, Hildén and Linkola 1955).

Hen Harrier (*Circus cyaneus*)

The Norwegian prey items listed by Hagen (1952) included 333 (59%) mammals of seven species and 228 (40%) birds of about 30 species:

Small rodents	57%
Shrews (*Sorex*)	1
Young hares (*Lepus*)	1
Small Passerines	21
Young grouse (*Lagopus*)	7
Waders (Charadriidae, Scolopacidae)	4
Other and unidentified birds	8

The birds included a young harrier. Some insects and two lizards were also found.

Osprey (*Pandion haliaëtus*)

This species feeds almost exclusively on fish, especially Pike (*Esox lucius*) and carp (Cyprinidae). Many nests have been investigated in Finland and Sweden, and in all but one of them only remains of fish have been found. The exception was a nest I discovered with three downy young Velvet Scoters (*Melanitta fusca*) which the young Ospreys had refused to eat. Preying upon mating frogs in the early spring while the lakes are still covered with ice has been reported from Finland (Hildén and Linkola 1955).

Hobby (*Falco subbuteo*)

Curry-Lindahl (1945) watched a nest with young near Stockholm, Sweden, for a total of 30½ hours. During this time insects were brought by the adults on 95 occasions and birds on eight occasions; there were also four other visits when the food could not be determined. The most regularly observed feeding areas of this species are wide marshlands where dragonflies (Odonata) are caught.

Peregrine (*Falco peregrinus*)

Investigations into the food of the Peregrine have been made by Hagen (1952) in Norway and, quite recently, by Sulkava (1959a) in Finland. There is considerable variation in the results, partly as a result of regional differences in the open country avifauna, and partly because this species tends to prey on the commonest birds in its hunting area. There are many other scattered records of food remains found in Peregrine eyries and it is clear that, in spite of its tendency to take the commonest species, this falcon preys on very many kinds of birds and is not in any way dependent on any particular one.

Hagen's data from the mountains of Dovre and certain other fjelds were based on 124 bird items of at least 32 species and he also found a single juvenile Blue Hare (*Lepus timidus*). Sulkava's records were from various parts of Finland and included 483 bird items of about the same number of species as Hagen found. The percentages from both investigations are set out below, with the Finnish material divided into two columns, the first (Finland A) based on 159 fresh remains and the second (Finland B) on 324 remains from earlier years. The latter may have been biased in favour of bigger species because of the difficulty of finding and identifying the remains of small birds. It will be noticed that Hooded Crows, Starlings, thrushes and small waders are high on both Norwegian and Finnish lists:

	Norway	Finland A	Finland B
Surface-feeding ducks (*Anas*)	10%	9%	27%
Grouse (*Lagopus*)	10	—	—
Black Grouse (*Lyrurus tetrix*)	2	—	4
Lapwing (*Vanellus vanellus*)	2	13	12
Curlew (*Numenius arquata*)	1	—	8
Small waders (Charadriidae, Scolopacidae)	11	15	9
Gulls, terns (Laridae)	2	20	9
Pigeons (*Columba*)	3	—	14
Cuckoo (*Cuculus canorus*)	5	—	—
Short-eared Owl (*Asio flammeus*), Tengmalm's Owl (*Aegolius funereus*)	5	—	—
Woodpeckers (*Dendrocopos*)	—	4	—
Hooded Crow (*Corvus corone cornix*)	23	9	12
Magpie (*Pica pica*)	5	—	—
Thrushes (*Turdus*), Starling (*Sturnus vulgaris*)	12	30	6
Small Passerines	5	—	—

The Norwegian list also includes 6% other birds, from Swift (*Apus apus*) to Storm Petrel (*Hydrobates pelagicus*). According to Hagen, Peregrines have been seen preying on young Slavonian Grebes (*Podiceps auritus*) and Velvet Scoters (*Melanitta fusca*), and even adult Cranes (*Megalornis grus*) and grey geese (*Anser*) have been reported in their diet.

Sulkava also summarised the available records of other Finnish ornithologists and, on these and his own observations, concluded that small Passerines, waders and gulls and terns together make up over three-quarters of the prey of the Peregrine in Finland. His broad figures were: Passerines up to the size of thrushes 30.8%, waders 28.4% and gulls and terns 18.3%. The last figure may well be on the small side, for in the coastal regions gulls and terns seem to be the main food in the breeding season. In the archipelago of southern Finland I have seen Peregrines make their kills on 32 occasions and every time the victim has been one of these birds. The species involved have been Common Tern (*Sterna hirundo*) (18 times), Arctic Tern (*S. macrura*) (5), Lesser Black-backed Gull (*Larus fuscus*) (5), Common Gull (*L. canus*) (3) and Caspian Tern (*Hydroprogne caspia*) (1).

Gyr Falcon (*Falco rusticolus*)

Hagen (1952) summarised the prey found as remains or in pellets during three breeding seasons in the Dovre mountains. From his analysis it is evident that in Scandinavia the Gyr Falcon preys to a very considerable extent on Ptarmigan (*Lagopus mutus*) and Willow Grouse (*L. lagopus*), and this agrees well with earlier investigations in other parts of the Scandinavian mountains. In Hagen's material no less than 205 of 214 prey items, or about 96%, were of one of these two

species. Other birds occurred only seldom, but a few mammals and some beetles were also recognised in the food remains. The mammals included young Blue Hare (*Lepus timidus*), Lemming (*Lemmus lemmus*) and the vole *Microtus*. The fact that it specialises to such an enormous extent upon Ptarmigan and Willow Grouse enables the Gyr Falcon to stay in the Scandinavian mountains throughout the winter, something which no other raptor can do.

Curiously, in spite of the fact that grouse are its main food, the Gyr Falcon's population is higher in or shortly after the years in which the small rodents reach their peak numbers (see Hagen).

Merlin (*Falco columbarius*)

The Merlin preys on small birds of all kinds up to the size of thrushes (*Turdus*) and even Woodcock (*Scolopax rusticola*) and young grouse (*Lagopus, Lyrurus*) and Capercaillie (*Tetrao urogallus*). According to Hagen (1952) whose analysis for this species in Norway was based on 713 food items, young game-birds form 4.5% of the diet, other birds about 90%, small rodents about 5% and insects the remainder. The birds occurring most frequently in Hagen's material were pipits (*Anthus*) (which formed 27% of all vertebrates), other small birds of open country and also thrushes. Rodents were found only at times when these mammals were particularly abundant.

In Finland a wintering female Merlin preyed on a flock of twelve Partridges (*Perdix perdix*) until all had been killed, but this was quite extraordinary.

Kestrel (*Falco tinnunculus*)

The Kestrel is very much a specialist predator on small mammals. A few small birds are also taken, but these very seldom include any game birds. Hagen (1952) collected data on 254 food items in Norway and these may be summarised as follows:

Small mammals	90%
Lizards, snakes	6
Small Passerines (to size of *Turdus*)	4

Also included were a young Black Grouse (*Lyrurus tetrix*) and a single frog.

Eagle Owl (*Bubo bubo*)

The food of the Eagle Owl has been fairly thoroughly studied. Curry-Lindahl (1950a) reviewed his own and other Swedish investigations, and Hagen (1952) summarised the Norwegian material. In addition, some interesting local studies were carried out in Finland by Olsoni

(1933) and März (1936). The Swedish and Norwegian results may be summarised as follows:

Sweden	%	Norway	%
Brown Rat (*Rattus norvegicus*)	18	Brown Rat (*Rattus norvegicus*)	3
Other small rodents	18	Other small rodents	40
Hares (*Lepus*)	4	Hares (*Lepus*)	7
Red Squirrel (*Sciurus vulgaris*)	7	Red Squirrel (*Sciurus vulgaris*)	3
Hedgehog (*Erinaceus europaeus*)	8	Hedgehog (*Erinaceus europaeus*)	1
		Other mammals	2
[266 mammals = 55% of all food items; even Cat (*Felis catus*) and Stoat/Weasel (*Mustela*)]		[432 mammals = 55% of all food items; even Fox (*Vulpes vulpes*) and Stoat/Weasel (*Mustela*)]	
Hooded Crow (*Corvus corone cornix*)	9	Crows (*Corvus*)	1
Smaller Passerines	1	Smaller Passerines	3
Birds of prey (*Buteo* 4 specimens, *Accipiter gentilis* 3, *Accipiter* sp. 1, *Pandion haliaëtus* 1)	2	Birds of prey (*Falco tinnunculus*, *F. columbarius*, *Buteo lagopus*, *Accipiter nisus*)	1
Owls (*Asio otus* 3, *Aegolius funereus* 1)	1	Owls (*Asio flammeus*, *A. otus*, *Nyctea scandiaca*, *Surnia ulula*)	1
Ducks (*Anas*)	5	Ducks (*Anas*)	3
Waders (Charadriidae, Scolopacidae)	1	Waders (Charadriidae, Scolopacidae)	3
Hill grouse (*Lagopus*)	1	Hill grouse (*Lagopus*)	7
Other game birds (*Tetrao*, *Lyrurus*, *Tetrastes*, *Perdix*)	7	Other game birds (*Tetrao*, *Lyrurus*)	2
Other birds	6	Other birds	2
[159 birds = 33% of all food items; about 30 species]		[184 birds = 24% of all food items; about 30 species]	
Frogs or toads	1	Frogs or toads	20
Fishes	11	Fishes	1

From the above data and the Finnish material, it is clear that there is considerable variation in the food of this species. In general, most Eagle Owls appear to feed largely on rodents, especially on Brown Rats and Vole Rats (*Arvicola terrestris*), and in some areas also on squirrels and hares. According to Curry-Lindahl, Eagle Owls are regularly seen hunting Brown Rats around human settlements which may be several miles from the nearest nest. However, some take many more birds, particularly Hooded Crows. A pair studied by Olsoni in south-west Finland depended largely on Jackdaws (*Corvus monedula*) which were breeding in a church not far away from their nest. In the Finnish archipelago various gulls, waders and other shore birds are frequent among the food remains of Eagle Owls.

PLATE 51. Broad-billed Sandpiper (*Limicola falcinellus*) at nest, Swedish Lapland, July 1936. The size of a small Dunlin, its proportionately shorter legs and long heavy-based bill, with a downward kink near the tip, give it a squat and ungainly appearance. The breeding adult has a strikingly striped head and its back is black with rich buff longitudinal stripes (pages 320-323) (*photo: P. O. Swanberg*)

PLATE 52A. Habitat of Broad-billed Sandpipers (*Limicola falcinellus*), Finland, June 1960 (especially the light strip that runs behind the tree). Most nests are in tufts in quaking bogs of mud and short grass (page 323) (*photo: C. W. G. Paulson-Ellis*)

PLATE 52B and 52C. Winter plumage, New Zealand, 1960. Adults are grey and white at this season, but note that the double superciliary is normally still marked (page 322) (*photos: D. A. Urquhart*)

PLATE 52D. Typical leaf-lined nest with four eggs, Swedish Lapland, June 1942. Only in Fenno-Scandia has this bird been proved to nest, but it doubtless does so in U.S.S.R. (page 321) (*photo: P. O. Swanberg*)

PLATE 53. Broad-billed Sandpipers (*Limicola falcinellus*), Swedish Lapland, July 1936. This nest was some 2,200 feet above sea-level, in the willow zone beyond the tree limit. Note the markings of head, breast and back and, in the slanting view below, the shape of the long, heavy, broad-based bill (*photos: P. O. Swanberg*)

PLATE 54. Broad-billed Sandpipers (*Limicola falcinellus*) at nest, Finland, June 1960. Note the richly striped back pattern, formed by buff edges to black feathers. These photos also show the variation in the head markings (page 322) (*photos: G. des Forges*)

Snowy Owl (*Nyctea scandiaca*)

Hagen (1952) reviewed the diet of the Snowy Owl in the Norwegian fjelds on an analysis of food remains, pellets and stomachs of shot birds:

Small rodents	97.5%
Shrews (*Sorex*)	0.3
Stoat/Weasel (*Mustela*)	0.3
Young Blue Hare (*Lepus timidus*)	0.1
Unidentified small mammals	0.1
Grouse (*Lagopus*)	1.2
Other birds	0.4
Fish	0.1

The total number of mammal items found was 1,428, of about nine species. Small mammals thus formed 98.3% of the prey identified. Only one Blue Hare and one fish are included in the above percentages.

The Snowy Owl is one of the best examples of a bird whose numbers fluctuate very markedly in accordance with the density of small rodents, and its dependence upon rodents is clear from food analysis.

Hawk Owl (*Surnia ulula*)

The investigations made by Hagen (1952) show that, at least in the breeding season and for as long afterwards as these mammals are abundant, the Hawk Owl preys on practically nothing but small rodents. These include Lemmings (*Lemmus lemmus*) and various voles (*Microtus, Clethrionomys*). Of other animals, only a young owl (*Surnia ulula*?), four small Passerine birds and one Stoat or Weasel (*Mustela*) were found in the total of 524 items studied.

Pygmy Owl (*Glaucidium passerinum*)

Hagen (1952) analysed 418 food items from Norway. These were made up of 287 mammals (68.6%) and 131 small Passerine birds (31.4%). About 44% of the mammals were shrews (*Sorex*), while the three commonest birds were Goldcrest (*Regulus regulus*), Great Tit (*Parus major*) and Yellowhammer (*Emberiza citrinella*) which appeared 22, 17 and 14 times respectively in the remains examined.

Hildén and Linkola (1955) examined the contents of two food storage holes of the Pygmy Owl in Finland. The first held the remains of 45 shrews (*Sorex*), 13 Bank Voles (*Clethrionomys rufocanus*), two Field Voles (*Microtus agrestis*), two Goldcrests and one Willow Tit (*Parus atricapillus*). The second contained 34 small mammals and three small birds, so that the two combined included 94 small mammals and six small birds. This is a very small owl with a clear preference for very small prey!

Tawny Owl (*Strix aluco*)

Observations from Norway (Hagen 1952), from Sweden (Curry-Lindahl 1950b) and from Finland, the last partly my own, clearly show that small mammals, especially rodents, form 70-80% of the food of the Tawny Owl, and that this proportion remains constant throughout the year. Shrews (*Sorex*) make up 11-14% of the diet, birds generally 3-10% and frogs about 2%. The largest animals in the Norwegian list of 803 mammal and 84 bird items were Brown Rat (*Rattus norvegicus*), Vole Rat (*Arvicola terrestris*) and Red Squirrel (*Sciurus vulgaris*); and Magpie (*Pica pica*), Jay (*Garrulus glandarius*), Tengmalm's Owl (*Aegolius funereus*), Woodcock (*Scolopax rusticola*), Cuckoo (*Cuculus canorus*) and Feral Pigeon (*Columba livia*). Feral Pigeons were recorded more than any other bird, indicating that Tawny Owls collect a lot of their food in towns and villages.

In years when the numbers of small rodents are low, young Common Terns (*Sterna hirundo*) and Black-headed Gulls (*Larus ridibundus*) partly replace mammals in this owl's diet in the coastal regions and at some inland gulleries in southern Finland, also in Sweden (Curry-Lindahl *in litt.*). In such years I have even found shells of snails (*Lymnaea* sp.) and Cockles (*Cardium edule*) in the pellets of owls breeding in the archipelago. In general, however, when populations of small rodents are low, Tawny Owls shift first to shrews, as has been shown by Curry-Lindahl.

Great Grey Owl (*Strix nebulosa*)

Collett (1921) stated briefly that in the winter months only small mammals are found in the food remains of the Great Grey Owl in Norway. He specifically mentioned wood mice (*Apodemus*), field voles (*Microtus*) and bank voles (*Clethrionomys*), also some shrews (*Sorex*). There have been no modern investigations into the food of this species, but observations made by Lundberg (1955) at a nest with young agree well with Collett's conclusion.

Ural Owl (*Strix uralensis*)

The food of the Ural Owl has been studied only in Norway. Of 87 food items summarised by Hagen (1952), 76 were small mammals, mostly Bank Voles (*Clethrionomys rufocanus*). The remainder were two Black Grouse (*Lyrurus tetrix*), two Hazel Hens (*Tetrastes bonasia*), two thrushes (*Turdus*), one Weasel (*Mustela nivalis*), one indeterminable rodent and two indeterminable birds.

Long-eared Owl (*Asio otus*)

According to Hagen (1952), the Long-eared Owl takes up to 95% small rodents (the species varying in different areas) and a few small

birds, of which thrushes (*Turdus*) and Tengmalm's Owl (*Aegolius funereus*) were the largest recorded. Hagen's material consisted of 733 prey items, all from the breeding season as this species is only a summer visitor in Norway.

Short-eared Owl (*Asio flammeus*)

The Short-eared Owl is also only a summer visitor in Fenno-Scandia, and Hagen (1952) showed that in the breeding season in the Norwegian fjelds it too feeds almost entirely on small rodents. These formed about 95% of the 508 food items he analysed. In addition, there were 2% Passerines, but no game birds at all.

Tengmalm's Owl (*Aegolius funereus*)

The food remains listed by Hagen (1952) included 149 small rodents and 15 shrews (*Sorex*), and clearly showed that Tengmalm's Owl feeds almost exclusively on small mammals, though some small birds and even insects are occasionally taken. If there is a shortage of small mammals, however, this owl turns to catching small Passerines as a regular part of its diet (Hortling 1929-31).

A nest I studied in southern Finland contained only remains of small rodents.

SUMMARY

(1) A summary is given of the published information on the food of seventeen diurnal birds of prey and ten owls in Scandinavia and Finland. The species concerned, which are dealt with under individual headings, are Golden Eagle (*Aquila chrysaëtos*), Buzzard (*Buteo buteo*), Rough-legged Buzzard (*B. lagopus*), Sparrowhawk (*Accipiter nisus*), Goshawk (*A. gentilis*), Kite (*Milvus milvus*), Black Kite (*M. migrans*), White-tailed Eagle (*Haliaëtus albicilla*), Honey Buzzard (*Pernis apivorus*), Marsh Harrier (*Circus aeruginosus*), Hen Harrier (*C. cyaneus*), Osprey (*Pandion haliaëtus*), Hobby (*Falco subbuteo*), Peregrine (*F. peregrinus*), Gyr Falcon (*F. rusticolus*), Merlin (*F. columbarius*), Kestrel (*F. tinnunculus*), Eagle Owl (*Bubo bubo*), Snowy Owl (*Nyctea scandiaca*), Hawk Owl (*Surnia ulula*), Pygmy Owl (*Glaucidium passerinum*), Tawny Owl (*Strix aluco*), Great Grey Owl (*S. nebulosa*), Ural Owl (*S. uralensis*), Long-eared Owl (*Asio otus*), Short-eared Owl (*A. flammeus*) and Tengmalm's Owl (*Aegolius funereus*). Some of these birds have been much better investigated than others. The food percentages given (mostly rounded) are by number and not by weight.

(2) Summaries of this kind can be misleading unless the effects of individual specialisation and of differences in habitat and the availability of food are borne in mind. In addition, some prey species leave much more recognisable remains than others.

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Studies of less familiar birds

113. Broad-billed Sandpiper

By I. C. T. Nisbet

Photographs by G. des Forges, P. O. Swanberg and D. A. Urquhart

(Plates 51-54)

ALTHOUGH MUCH has been discovered in recent years about the lives of Palearctic waders, that of the Broad-billed Sandpiper (*Limicola falcinellus*) is still largely a mystery. It occurs in most parts of Europe and Asia, but neither its summer nor its winter range has been fully worked out, and very little is yet known about its breeding biology. Its obscurity seems to be due mainly to its secretive behaviour in the breeding season, and to its allegedly nondescript appearance in winter plumage. However, as Browne (1955) has pointed out, this species is really quite distinctive in the field, and there seems no reason why it should not become better known.

It is known to breed over much of Scandinavia, from arctic Norway and Finland south to the mountain bogs of southern Norway and central Sweden. To the east, it is thought to breed right across European Russia and Siberia to the Pacific coast, but this presumption is based entirely on records in winter and on passage (Harber 1955), and there is not one definite breeding record from the whole of this vast area!

Most reference books state that the western populations winter around the Black and Caspian Seas and the eastern Mediterranean, but I have found little evidence for this except a few records of straggling individuals. It is certainly known to winter in small numbers in Egypt (Meinertzhagen 1930), but it apparently does not do so in the Black Sea (Dementiev and Gladkov 1951), while recent observations have suggested that it occurs mainly as a passage migrant in such places as the southern Caspian (Passburg 1959), Cyprus (W. R. P. Bourne *in litt.*) and Greece (Bateson and Nisbet in press). Even at Aden, where some spend the winter, the numbers are much larger in the passage seasons (Browne 1949, Paige 1960). Hence it seems likely that there must be an important undiscovered wintering-area somewhere in east Africa. Farther to the east, it winters in the Persian Gulf (Meinertzhagen 1954), India (Blanford 1898), Burma (Smythies 1940), Indo-China (Dementiev and Gladkov 1951), the Philippines and Micronesia (Voous 1960); flocks have been seen in some recent years in south-east Australia (Hindwood and Hoskin 1954), and there is even a record in New Zealand (Sibson and McKenzie 1960—the bird illustrated in plates 52b and 52c). It is nowhere outstandingly numerous, but it is by no means "rare virtually everywhere", as alleged by Voous (1960): flocks of 20-30 are commonplace in its normal haunts, H. P. Medhurst (*in litt.*) has seen as many as 500 in a day at Aden, and Smythies (1940) describes it as "abundant" on some parts of the Burmese coast. Indeed, Merikallio (1958) suggests that something like 11,000 pairs breed in Finland alone.

On migration the western birds occur regularly in Denmark, Sweden and Germany, and stragglers are seen at times as far west as southern France. To Britain, however, it is only a vagrant. *The Handbook* (1941) quoted about 20 records and some 11 birds have been reported since, but probably only about five of the latter would now be accepted in the light of modern knowledge of the species. Of the 25 fully acceptable British records, seven have been in spring (mid-May to mid-June) and the rest in late autumn (mostly mid-September to mid-October). On migration it is most likely to be found in salt-marsh creeks and on the muddy edges of salt lagoons, but it occasionally visits open muddy shores and inland waters.

The Broad-billed Sandpiper is an odd-looking bird, about as large

as the smallest of Dunlins (*Calidris alpina*), but with proportionately shorter legs (plate 51) and with a bill which would look long even on a large Dunlin. The shape of the bill is distinctive, rather heavy at the base and with a noticeable downward kink towards the tip (plates 51, 52b, 53, 54a). This long heavy bill, on a bird scarcely larger than a Little Stint (*C. minuta*), gives it a squat, ungainly appearance, which is only slightly relieved by its active feeding habits. In breeding plumage, adults are completely unmistakable, having a strikingly striped head and blackish upper-parts with rich buff longitudinal stripes (plates 51, 53 and 54). As many text-books point out, this plumage is superficially like that of a Jack Snipe (*Lymnocryptes minimus*), but in fact there is little danger of confusion with that species, since the general shape and appearance of the bird suggest a Dunlin or Little Stint. In winter plumage (plates 52b and 52c) adults are grey above and white below and look much like Dunlins, but the stripes on the head are still conspicuous and unmistakable. These markings consist of a white superciliary stripe separated by a narrow dark line from a second white stripe on the side of the crown. In the birds shown in the plates the dark line runs forward almost to the bill, but in most of the individuals I have seen in the field it appeared to stop above the eye, giving the impression of a single wide superciliary which divided into two behind the eye. As the plates suggest, the conspicuousness of the upper white stripe is rather variable: all the 30-odd Broad-billed Sandpipers I have seen in autumn showed it clearly, but Medhurst (*in litt.*) tells me that it does not show at all on a small minority of winter birds. Other plumage characters of winter adults include upper-parts slightly more coarsely marked than Dunlin's; breast more finely speckled; throat and belly pure white, not clouded or streaked; and a dark spot on the carpal joint, recalling a winter Sanderling (*Crocethia alba*) (though this is often hidden by the flank feathers). Immatures on autumn migration (in August and September) look much like summer adults, but the breast and eyestripes are suffused with buff, and the upper-parts are patterned in chequers of dark brown and buff. In flight the species shows less wing-bar than a Dunlin (sometimes none at all), but much white on the sides of the tail-coverts. The flight-note, unmistakable when known, is a dry *chr-r-r-reet*, which is more trilled than a Dunlin's note but lacks the musical quality of a Curlew Sandpiper's (*Calidris testacea*); it is much like the call of a Pectoral Sandpiper (*C. melanotos*), but is buzzier, with more of an "*-ee-*" sound. *This note and the double eyestripe are the best characters of the species in all plumages.*

Very little seems to have been published on the breeding of the Broad-billed Sandpiper since the scanty notes in *The Handbook* (1940), although it has been photographed at the nest several times. A typical

habitat of this species can be seen in plate 52a. It breeds secretively in quaking bogs, hiding its nest in tussocks of vegetation surrounded by treacherous semi-liquid mud; several pairs may be found together and Merikallio refers to "colonies". Plates 51, 52d, 53 and 54 show typical nests, while others were illustrated in this series in 1947 (*Brit. Birds*, 40: plates 16-18). Davidson (1952) described a striking song-flight, in which this bird, usually skulking and secretive, "rises several hundred feet over its native bog, gliding gradually downwards in wide sweeps on quivering outstretched wings, uttering a continuous wheezy trill like a distant alarm clock". However, no one seems to have witnessed its courtship displays, nor have its incubation and fledging periods been determined. A thorough study of this odd little bird would be a very worthwhile project for anyone fortunate enough to spend a summer in its breeding area.

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Notes

Preening in flight.—So often one does not know what is unusual until someone else says it is. I refer to the publication of a note on a Little Gull (*Larus minutus*) preening in flight (*Brit. Birds*, 54: 117)

Some attitudes adopted by (*left to right*) Black-headed Gull (*Larus ridibundus*), Swifts (*Apus apus*) with wings elevated and depressed, and White-winged Black Tern (*Chlidonias leucopterus*) when preening in the air (see text) (*sketches: D. I. M. Wallace*)

and the brief editorial comment following it. Since then I have been sifting through my records and find that I have seen preening in flight by six species of two families:

Laridae	Common Gull (*Larus canus*), adults in winter
	Little Gull (*Larus minutus*), immature in October
	Black-headed Gull (*Larus ridibundus*), adults and sub-adult in winter
	White-winged Black Tern (*Chlidonias leucopterus*), adult in October
Apidae	Swift (*Apus apus*), adults in May and June
	Pallid Swift (*Apus pallidus*), adult in May

In the case of the Laridae, it is presumably their power of supremely buoyant flight that allows the convenience of preening in the air. The White-winged Black Tern was still in moult and I saw several feathers drop from its body plumage. With the swifts (and considering the speed of their flight) it may be that any feather out of place damages the aero-dynamic efficiency of the birds and, therefore, their removal or replacement is rather more imperative than convenient.

D. I. M. Wallace

Black Duck in Co. Wexford.—On 18th February 1961, I discovered a strikingly dark Mallard-type duck, which I immediately recognised as a Black Duck (*Anas rubripes*) of eastern North America, on the west channel of the North Slob, Co. Wexford. Other ducks present at the time included about a thousand Wigeon (*A. penelope*) and a few Mallard (*A. platyrhynchos*), Teal (*A. crecca*), Pintail (*A. acuta*) and Shoveler (*A. clypeata*). The Black Duck soon flew off over Wexford Harbour, but fortunately it was seen again in almost the same place (between Begerin Bridge over the channel and the pumping station on the seawall) on at least the next three days. Major and Mrs. R. F. Ruttledge were able to confirm my identification on 20th February and I last saw the bird on the 21st, after which I left the area. Observers who looked for it on the 25th, and subsequently, were unable to find it.

The following description is based on details I wrote down at the time and on notes later supplied by Major Ruttledge.

At rest, the sooty-brown back, wings, under-parts and tail made it easy to pick out from the other ducks. In size it resembled a Mallard, though its dark colour perhaps made it look a little larger. In contrast to the rest of the body, the head and neck were pale buffish, except for the crown and nape and a stripe through the eye, which were dark. The bill was similar in shape to that of a Mallard and yellow in colour with a slight greenish tinge. Even when the bird was on the water, it could be seen that the deep blue speculum did not have broad white margins as in the Mallard. In flight this feature was particularly noticeable, though the white tips of the secondaries did form a narrow band along the hind edge of the wing. Another striking feature in flight was the contrast between the sooty belly and the silvery-white linings on the under-sides of the wings.

This is the second Irish and European record of the Black Duck, the first being a specimen shot on 5th February 1954, near Mullinavat, Co. Kilkenny (*Brit. Birds*, 48: 341). In view of the unusually disturbed weather conditions over the North Atlantic during the autumn, with numerous eastwards-moving cyclones, and the fact that a number of Nearctic vagrants occurred in Britain as a result, it seems reasonable to believe that the Wexford Black Duck was not an escape from captivity. It certainly seemed wild and was easily disturbed.

C. J. CADBURY

Turnstones feeding on bread.—On innumerable occasions between the autumn of 1960 and the spring of 1961, at the South Gare breakwater, Teesmouth, Yorkshire, a wintering party of Turnstones (*Arenaria interpres*) were seen to eat white and brown bread and seed-cake, a type of food not mentioned in *The Handbook*. Various observers and I saw them feeding in this way on several occasions, but it was the lighthouse keepers who first noticed it. They told me that the birds had probably contracted the habit from some Feral Pigeons (*Columba livia*) which had been present in the autumn. The bread and cake were thrown out each morning and the Turnstones would be sitting and waiting on the wall with the pigeons. As soon as it was put out, they would immediately fly down and eat it. There was no doubt that they actually swallowed the food and did not just play with it. After the pigeons departed, the Turnstones continued the habit and became so tame that most or all of them were killed by the keepers' cat.

D. G. BELL

On 3rd September 1960, I came across a number of Turnstones (*Arenaria interpres*) on the shingle beach at Penzance, Cornwall. Two

of these had found hard crusts of bread, into which they were probing forcibly with their bills—sometimes standing on the bread to do so—without managing to dislodge even the smallest piece. After each unsuccessful attempt they would flick the bread to one side and then feed in the normal manner. Eventually, however, the incoming tide reached the crusts and quickly softened them. The birds then pulled them rapidly apart and swallowed fairly large pieces.

BERNARD KING

[We should be glad to have any further records of this interesting behaviour. It would be valuable to have observations of bread-eating by juvenile Turnstones in order to form some idea of whether they do it on their own initiative or because they follow the example of other birds. Dr. I. C. T. Nisbet watched a similar incident in the United States on 27th December 1957, at a public camp-site on the Caribbean coast of the Florida Keys. Every time a party of people finished their picnic and drove away, a flock of Turnstones flew up from the rocks and swarmed around *and over* the vacated picnic table, clearing up the scraps and crumbs left behind. The promptness with which the birds moved in when the picnickers left suggested this was a regular habit. Another case is mentioned by H. M. Hall (*A Gathering of Shore Birds*, New York, 1960).—EDS.]

Short-eared Owl mobbing Fox.—On 18th August 1960, I saw a Short-eared Owl (*Asio flammeus*) hunting at dusk over a meadow behind the sea-wall at Easington, Yorkshire. A Fox (*Vulpes vulpes*) appeared near the sea-wall and began to cross the field. The owl immediately began to mob it, diving at the animal's head rather as terns (*Sterna* sp.) at a nesting colony mob human intruders. As far as I could see, the Fox was not actually struck, though the bird pulled out of its dives only inches above the animal's head. The Fox took absolutely no notice of the owl's display and continued leisurely across the field. Short-eared Owls had only been seen irregularly in the area during the summer, so that it is very unlikely that the bird was defending a nesting site. The date would also be late for any but a second brood.

The owl made no attempt to mob me when I crossed the meadow a few minutes later.

P. R. EVANS

Short-eared Owls killing Weasels.—On 18th April 1961, at Stambridge, Essex, I found single dead Weasels (*Mustela nivalis*) at the roosts of two Short-eared Owls (*Asia flammeus*). One had wounds around its throat and neck, but was otherwise unmarked. The other had similar throat and neck wounds and, in addition, a patch of fur had been ripped from its hind quarters; this animal had been dead for several

days and maggots were present around the neck wound. *The Handbook* makes no mention of Weasels being attacked by these owls.

T. J. LAWES

Swallows rearing brood in Robins' nest.—The report of Swallows (*Hirundo rustica*) using the nest of a pair of Spotted Flycatchers (*Muscicapa striata*) (*Brit. Birds*, 54: 287) particularly interested me as I had just heard from my cousin, W. Grierson Macmillan, of a very similar occurrence at Balerno, Midlothian. In 1960 a pair of Robins (*Erithacus rubecula*) had a nest against the wall in his garage, on top of a beam supporting the rafters. Early in June 1961 Swallows were found to have laid five eggs in the nest without adding mud or other material to it. The young hatched and fledged successfully, but the mossy nest gradually disintegrated and, although a board was nailed up to support the remnants, the young Swallows ended up sitting on the beam. While the five fledglings returned to roost on an electric cable hanging from the rafters, the adult birds proceeded to build a genuine mud and straw nest nearer the door but in a similar site to the Robins' nest. Four eggs were laid and these hatched about 29th July, when the first brood could still be seen flying about the house. This is the first time that Swallows have nested at this house.

ANDREW T. MACMILLAN

Sand Martins nesting in a heap of sawdust.—With reference to the note by Dr. R. A. F. Cox on Sand Martins (*Riparia riparia*) nesting in a sawdust heap (*Brit. Birds*, 54: 205), we found a single pair in a similar site near Errogie, Inverness-shire, on 12th June 1961. The sawdust pile in this case was about nine or ten feet high, and a "cliff" had formed on the south-west side. Here there were some five or six nesting holes, though only the one was in use. This was roughly six feet above the ground. The sawdust had little or no reinforcement and although dry—at least on the surface—was compressed into quite a firm mass.

J. B. and S. BOTTOMLEY

[Two letters on this subject, drawing attention to published records from Suffolk and Sweden, appeared in our July issue (*Brit. Birds*, 54: 292).—EDS.]

Voice of the Whinchat.—An anxiety note of the Whinchat (*Saxicola rubetra*) which I do not find given in *The Handbook* seems worthy of mention. It is uttered frequently by both sexes when young are present and I have variously rendered it as a soft *chup*, *chip* or *tuup*; though somewhat louder than the flight call of the Chaffinch (*Fringilla coelebs*), it is so similar that one could excusably expect to see a Chaffinch passing. This note is often the first indication of the presence of

breeding birds and I find it is used far more than the chat-like *tic-tic*. It can be heard at some distance, is quite unlike any note of the Stonechat (*S. torquata*), and is an excellent aid to identification if the bird cannot be well seen. In June 1961, I discovered a pair of Whinchats and their young in Co. Westmeath—the first breeding record for that county—simply by hearing this call at a distance of nearly a hundred yards!

ROBERT F. RUTTLEDGE

Reviews

Atlas der Verbreitung palaearktischer Vögel. Part 1. Edited by Erwin Stresemann and L. A. Portenko, with contributions by G. Eber, G. Mauersberger and J. Szijj. Akademie-Verlag, Berlin, 1960. 98 pages including 20 two-coloured distribution maps. DM.28.

The specification for this atlas of distribution of Palearctic birds has been laid down with precision and executed with remarkable thoroughness. It has resulted in the most authenticated and detailed set of maps yet to have appeared. Basically each map consists of a red line demarking a bird's breeding range. The line is drawn through a series of known localities on the perimeter of the range, each locality being pin-pointed and numbered. The numbers are the key to the localities concerned which are listed below each map, the list also showing the name of the recorder in each case and the bibliographical reference (apart from the few obtained by correspondence). Each record is dated, moreover, the authors rightly stressing the desirability of using observations as recent as possible when dealing with so fluid a subject as bird distribution, but in a number of maps over a quarter of the locality dates are more than 50 years old. This is a tribute to the great depth of research undertaken, but must risk reducing the reliability of the result.

A further feature of the list of locality records is that each is coded according to the nature of the observation (which may vary, for example, from the finding of a nest to the sighting of adults in the breeding season), and an indication is often given of whether the species was numerous or represented by, say, a single pair.

On most maps the numbered locality markers show pockets of breeding outside the main range embraced by the red line. The latter, of course, in linking specific localities, avoids the rather arbitrarily smoothed curves which often appear on maps of this sort. Exactitude of definition is assisted by the scale which, although varying from one map to another, is generally considerably larger than that of previously published distribution maps.

Each map is accompanied by a brief text giving notes on races and closely related species, range, ecology and migration.

The great merit of this atlas is that the reader is not asked to take anything on trust; each point on it can readily be ascertained and re-assessed, and the present reviewer welcomes the opportunity of acknowledging in advance the considerable help it will undoubtedly be in revising the maps in the *Field Guide to the Birds of Great Britain and Europe*. Yet a comparison between, for example, the map of the Ortolan Bunting in the present work and that in K. H. Voous's *Atlas of European Birds* shows many substantial differences in many widely separated countries; it suggests that it is inadvisable to accept any one method as the best way of arriving at the distribution of a species, that the literature may not yet contain all the answers, and that further research is necessary. Perhaps the appearance of this latest atlas will encourage widespread publication of up-to-date breeding records near the limit of a bird's range.

The atlas is planned to extend to ten parts and to cover some 200 species, chiefly Passerines, out of the total of about 800 in the Palearctic. The first part deals with a selection of warblers, buntings, shrikes, pipits, flycatchers and one finch and one creeper, and includes two purely Asiatic species. An important feature of the work, for western ornithologists in particular, is the contribution of the Russian co-editor, Prof. Portenko, who has searched much obscure literature to establish distribution in Soviet territories. P. A. D. HOLLOM

Animal Vision. By R. H. Smythe. Herbert Jenkins, London, 1961. 250 pages; 102 line drawings and sketches. 25s.

Mr. Smythe is the author of a standard text on *Veterinary Ophthalmology* and an examiner in surgery for the Royal College of Veterinary Surgeons. From his professional knowledge stems his interest in the wider, general field of animal vision that forms the basis of his new book. In this he has attempted to deal with a vast, and at times complex, subject, in a manner that can be comprehended by the average, non-specialist reader, and there is, indeed, a great deal of information in this book to interest an enquiring mind. The astonishing variety of types of eyes, ranging from the extremely rudimentary "eye" of Nautilus and the "Portuguese Man-of-War" through to the complex eyes of some insects and the efficient eyes of the higher vertebrates, are described and discussed. Readers of *British Birds* will be mainly interested in the author's descriptions of birds' eyes and their special adaptations to the bird's way of life; for of all the senses, that of sight is the most important in directing the life of a bird.

However, the great complexity of the subject of animal vision, and the need for specialist knowledge in practically every branch of it,

have tended to defeat the author. Some of his generalities are especially open to criticism. Such phrases as "Bodily adornments cut no ice in animal courtship" and "Very few animals can determine the sex of another of the same species by visual examination" will astonish the ornithologist and perplex even the casual observer of birds. Many experiments have shown that, while posture and reaction are important factors in the mutual recognition of the sexes in many species of birds, colour and adornment may also play an important part in recognition, as, of course, they do in much bird display and courtship.

The book is lavishly illustrated, but the illustrations are of very variable quality. That Mr. Smythe can sketch well is shown, for example, by his head of a thoroughbred horse on page 51, but his publishers have served him ill in retaining the badly-styled, open script lettering with which he has captioned many of his line-drawings.

Altogether, I found this a book at once fascinating and frustrating, but if it stimulates the student, as well it may, to delve more deeply into the original papers that have furnished the information it contains, its purpose will have been served. STUART SMITH

Nestboxes. By Edwin Cohen. British Trust for Ornithology, Oxford, 1961 (revised edition). 48 pages; 31 text figures and two photographic plates. 3s.

The new, enlarged edition of this excellent manual has been brought up to date and incorporates a great deal of information on new designs and materials which have been proved successful. It is a thoroughly practical and copiously illustrated work which will undoubtedly receive wide circulation not only in this country but also abroad, where the influence of the B.T.O. is steadily increasing. The variety of ideas the booklet contains is a tribute to the inventiveness of ornithologists, and the author is to be complimented for his insistence that previous designs which have failed to stand the test of practicality in the field should now be discarded.

A casual inspection will show how considerable has been the transition over the past few years from the primitive tit-boxes, with a useful life of two or three years, to durable boxes with inspection devices, which will attract a wide variety of species from tree-ducks to Wheatears and Swifts. The use of pre-cast wood-pulp and concrete, and moulded plastics, is likely to have a far-reaching influence and will be particularly welcomed by those who have had to face the labour and cost of frequent replacement of wooden boxes when engaged in long-term research. The rather high initial cost of these modern materials need not deter those willing to try their hands at making their own boxes by the methods given in the manual. The failure of

many designs of wooden boxes to exclude water should perhaps have received greater emphasis, though some warnings are certainly included; there is little doubt that insufficient attention to this is the cause of a high proportion of nesting failures among some species and also of rapid deterioration in the boxes. The use of plastic cement, such as Bostik, between all joints should be obligatory.

Excellent advice is given on siting and density, two subjects which are frequently misunderstood. The growing problem of predation receives well deserved mention. Anyone who has seen how quickly a Weasel learns to devastate a closely sited group of nest boxes must, however, wait for a future edition of this admirable manual for a solution to the problem. One small criticism: it is regrettable to find a B.T.O. publication continuing to use scientific names which have been superseded. GUY MOUNTFORT

Letters

The breeding range of the Waxwing in Fenno-Scandia

Sirs,—May I be permitted to comment on the breeding range of the Waxwing (*Bombycilla garrulus*) in connection with the recent excellent paper on Waxwing invasions during 1956-60 (*Brit. Birds*, 54: 1-30). In this paper, R. K. Cornwallis published a map (Fig. 14) showing the normal breeding area and the range extensions in Fenno-Scandia in 1956, 1957, 1958 and 1959. Since the map is on a comparatively large scale (*cf.* Fig. 1 in the same paper and the maps in K. H. Voous's *Atlas of European birds* and in the *Field Guide*), I feel that readers may expect it to be correspondingly more accurate.

For this reason it seems worth noting that J. Cunningham, P. E. Naylor and I saw a number of Waxwings between 3rd and 13th July 1957 in areas west and north of those marked in Mr. Cornwallis's Fig. 14 as representing the normal breeding distribution and the 1957 extension. Our records of Waxwings for those eleven days were as follows:

Norway

Sör-Varanger (Pasvikelv): at Nyrud, at least eight on the 7th in a half-mile of thin swampy pine forest (*The Handbook* gives this habitat as "a favourite haunt"); between Dobbeltvand and Ellenvand or Ellejr., three on the 9th in dense pine forest; and at Skogly, near Vaggetemjr., one on the 10th in pines by a lake. When we were discussing the breeding population of Pasvikelv with our host at Nyrud, Mr. Schaaning, he opined that Waxwings were of annual occurrence as breeding birds in the wide heavily forested strath of the Norwegian/Russian border, adding specifically that 1957 was "a good year". The localities mentioned above are between 35 and 60 kilometres north-east of Lake Inari, Finland, through the middle of which Mr. Cornwallis has drawn the northern edge of his normal breeding distribution.

Lakselv: one on the 11th in dense birch scrub; at about 70°N this is at least 105 kilometres further north than Mr. Cornwallis's limit.

Karasjok: noted as "in evidence" on the 11th, but numbers not recorded; this is about 50 kilometres north of the published limit.

Finland

Karigasniemi: at least ten on the 12th in a quarter-mile of mixed pine and birch forest about 35 kilometres north of the published limit. These birds were staying in the tops of particular trees and were clearly "in residence".

It should be stated that in no instance did we find a nest or obtain any clear evidence of breeding. Nevertheless, J. Cunningham had found Waxwings noticeably less numerous in the same areas in 1953 and we all assumed at the time that those seen in 1957 were breeding.

The Handbook gives the limit of the distribution of this species in Norway as 70°N. We did not record it north of this latitude, but south of it even our restricted observations suggest that in suitable habitats Waxwings can be more widespread in a year of plentiful food than Mr. Cornwallis shows and Mr. Schaaning's long local experience indicates that they do occur annually well to the north of Lake Inari. Perhaps the best guide to the Waxwing's northern limit in Eurasia is that of the July isotherm of 50°F., also quoted by Mr. Cornwallis, but in Fenno-Scandia this does not coincide exactly with the limit of tree-growth, which must be the primary external control on the breeding distribution of a tree-nesting species.

By these remarks I make no criticism of the conclusions and discussion published by Mr. Cornwallis. Indeed our records, while pointing to the presence of small and scattered breeding populations in areas to the north-west and north of the geographical limits taken by Mr. Cornwallis, also show that those populations are subject to a doubling-up process in good years, this being clearly allied to the direct southward extensions of the minimum area of breeding distribution detailed in his Fig. 14. D. I. M. WALLACE

[There was a nest with eggs at Karigasniemi in June 1958.—I.J.F.-L.]

Bird names

Sirs,—Your correspondent, Mr. Louis J. Halle, claims (*Brit. Birds*, 54: 255-256) that there is a need for more definitive bird names, but we already have these in the form of the scientific nomenclature. From my own experience in Africa and elsewhere, I suggest that the scientific name is as easily remembered as the vernacular. Furthermore, it has the overwhelming advantage of precision and universal acceptance. MICHAEL RAYNER

[Sad to say, the average Briton (unlike his counterpart on the Continent) is as reluctant to learn scientific names as he is to master foreign languages.—EDS.]

Recent reports and news

By I. J. Ferguson-Lees and Kenneth Williamson

[These are largely unchecked reports, not authenticated records]

This summary is mainly concerned with the eight weeks from mid-June to early August and follows on after the one in our July issue (pages 293-296). It covers the rarer species and some first impressions of the early autumn movements.

NORTHERN AND AMERICAN WADERS

The return passage of waders began, as it often does, in the last week of June and gathered momentum during July. At first it was only the usual species which were involved—**Dunlins** (*Calidris alpina*), **Ruffs** (*Philomachus pugnax*), **Common Sandpipers** (*Tringa hypoleucos*), **Greenshanks** (*T. nebularia*), **Green Sandpipers** (*T. ochropus*) and so on. Then came a few **Wood Sandpipers** (*T. glareola*) and **Spotted Redshanks** (*T. erythropus*), but the latter were in smaller numbers than is often the case and it was left to the **Little Stint** (*C. minuta*) and, especially, the **Curlew Sandpiper** (*C. testacea*) to provide the fireworks.

Whereas the general pattern of the *Tringa* waders is fairly similar from year to year, the arrivals of these two species are quite unpredictable. Looking back for a moment on the last three autumns, one recalls that Curlew Sandpipers were extremely rare throughout the autumn of 1958, apart from a small crop of isolated reports in early October (*Brit. Birds*, 51: 443), while 1959 produced an avalanche of them in late August and mid-September (*Brit. Birds*, 52: 438), and 1960 saw a sizeable fall in mid-September. Similarly, there were few Little Stints in 1958, rather more in 1959, and a huge and unprecedented invasion in 1960 (*Brit. Birds*, 53: 531-533). This autumn is already different in that the first Little Stints and Curlew Sandpipers began to arrive in mid-July, and from about the 22nd the latter in particular were being reported in a number of eastern districts. One Curlew Sandpiper even appeared as far west as Radnorshire on 23rd July, the first record for that county. Thus, there was a considerable arrival of both these arctic Siberian species a month earlier than usual and most, if not all, were adults instead of the majority being juveniles as is usually the case; many of the Curlew Sandpipers were in red plumage. One wonders whether this unusually early arrival signifies a disastrously unsuccessful breeding season. Both species were mainly in parties of two to eight in late July and early August, but as many as twenty-eight Curlew Sandpipers were seen as far inland as Nottingham on 8th August and larger groups were reported in East Anglia about the same time.

Two other northern waders, one uncommon and the other rather rare, might also be mentioned here. There was a slight influx of **Temminck's Stints** (*C. temminckii*) on spring passage in the last ten days of May, during which time the species was reported in Kent, Surrey, Suffolk, Norfolk and Devon. There was then one at Grove Ferry (Kent) on 27th June, and the first autumn birds appeared at Stoke (Kent) and Dibden Bay (Hampshire) on 22nd and 24th July; on 9th August there was one near Nottingham. **Broad-billed Sandpipers** (*Limicola falcinellus*) are much less commonly recorded than their numbers in Fenno-Scandia might lead one to expect (see page 321), but one stayed at Teesmouth (Co. Durham) from 13th to 19th August (probably two on 14th and 19th) and another at Nottingham from 23rd to 26th.

The scattering of American species continues. The **Wilson's Phalarope** (*Phalaropus tricolor*) at Marazion Marsh (Cornwall) (*Brit. Birds*, 54: 295) stayed for over a month and was last seen on 21st July. Meanwhile, another Wilson's Phalarope remained at Nottingham from 16th to 28th July and a third appeared in

Ireland. A **Greater Yellowlegs** (*T. melanoleuca*) was identified at Shotton Pools (Flintshire) on 23rd July, a surprisingly early **White-rumped Sandpiper** (*C. fuscicollis*) was watched by many observers at Salthouse (Norfolk) during 28th-30th July (this species is usually more often seen in October and November) and the first **Pectoral Sandpipers** (*C. melanotos*) of the autumn were reported from Minsmere (Suffolk) and Stoke (Kent) on 9th and 12th August.

GULLS AND TERNS

Following the **Sabine's Gull** (*Xema sabini*) in Dorset in June (*Brit. Birds*, 54: 296), there were two adults at St. Ives (Cornwall) on 16th July and single ones on 19th and 22nd August. The same area produced four, possibly six **Mediterranean Black-headed Gulls** (*Larus melanocephalus*) in the three weeks from 31st July, two of them staying for at least ten and eighteen days. A summer adult was seen at St. Mary's Bay (Kent) on 9th August and the one at Hartlepool (Co. Durham) (*Brit Birds*, 54: 186) returned for the sixth successive season on the 11th. Earlier, there had been an adult at Lowestoft (Suffolk) on the 16th, an adult in summer plumage at Brighton (Sussex) on the 16th and 17th, and two adults, one in summer plumage and one in winter, at Shoreham (Sussex) on 25th July. The Cornish records are particularly interesting because it was only in 1960 that this species was first recorded in that county and it certainly appears to be getting much less rare on the south coast as a whole. In Sussex, of course, it has been seen with some regularity for several years. It is worth reflecting that twelve years ago this gull had been recorded only about a dozen times in the whole of Britain and Ireland.

Little Gulls (*L. minutus*) continue to increase in eastern areas of England, and in some places, even in early autumn, these birds are now seen with as much regularity as on the coasts of Angus and Fife, though in generally smaller numbers. On 30th July there were as many as eleven at Hurworth Burn Reservoir (Co. Durham), this number rising as high as 22 by 15th August. A total of five immatures were noted inland at two localities in Nottinghamshire on 8th August, and a single one as far west as Flintshire on 30th July.

The end of the first week of August also saw the start of a small but significant influx of **Black Terns** (*Chlidonias niger*). This reached a peak on the 8th when there were parties of fifteen to thirty in counties as widely separated as Somerset, Suffolk and Lincoln and some 65 at Shotton Pools (Flintshire), as well as smaller numbers inland in the Midlands. Earlier, there had been odd Black Terns in various counties from Kent and Surrey to Cornwall since mid-July. An adult **Caspian Tern** (*Hydroprogne caspia*) at Walthamstow Reservoirs (Essex) on 9th July was followed by another (or perhaps the same?) at Minsmere (Suffolk) on the 16th.

OTHER LARGE WATER BIRDS

Though the **Little Egret** (*Egretta garzetta*) has been reported with much greater regularity over the last decade, many of the records have been in May and June. It is therefore interesting that one was identified in Orkney on 30th July (it had just possibly been there since late June) and stayed until 5th August, on which day another was first seen in Anglesey; the latter remained until at least the 20th. Earlier, there had been one at Lodmoor, Weymouth (Dorset), from 17th to 29th June. A juvenile **Purple Heron** (*Ardea purpurea*) appeared at Sandwich Bay (Kent) on 30th July, while there was the usual scattering of **Spoonbills** (*Platalea leucorodia*) in July and August, in counties as far apart as Somerset, Kent and Suffolk.

A slightly unreal atmosphere among long-legged water-birds was provided by several obvious escapes. Two apparently wild birds which appeared on 1st June at Odstock, near Salisbury (Wiltshire), were at first assumed to be Common Cranes (*Megalornis grus*), but photographs clearly showed them to be **Sarus Cranes** (*M. antigone*), a reminder that imperfectly seen cranes may not be all that they seem. A

Flamingo (*Phoenicopterus ruber*) was observed at three localities in Essex between 28th June and mid-July, and what was presumably the same bird afterwards appeared at two places in Kent on 23rd and 24th July. This was an all-vermilion bird of the American race. Meanwhile, a much whiter individual was seen in flight at Hill Head, near Fareham (Hampshire), on 19th July. A south-east Asian **Black-headed Ibis** (*Threskiornis melanocephala*) at Grove Ferry (Kent) on 7th August was still present on the 12th. Of similarly dubious origin was an adult **Snow Goose** (*Anser caerulescens*) which stayed on Lockwood Beck Reservoir (Yorkshire) from 12th July into August. An eclipse male **Red-crested Pochard** (*Netta rufina*) at Hanningfield Reservoir (Essex) on 9th July and two at Seaton Burn (Northumberland) from the 8th to the 13th may or may not have been wild birds.

It is perhaps reasonable to conclude this section with mention of a **Cory's Shearwater** (*Procellaria diomedea*) at Hartlepool (Co. Durham) on 8th July. The first **Balearic Shearwater** (*P. puffinus mauretanicus*) of the autumn was seen at St. Ives (Cornwall) on 13th August.

BIRDS OF PREY

Following the influx of **Red-footed Falcons** (*Falco vespertinus*) in May (*Brit. Birds*, 54: 294), the male on St. Agnes (Isles of Scilly) was seen again on 1st June, and it or another appeared near-by on St. Mary's on the 3rd and 4th. Later, on 21st June, a first-summer male was identified at Spurn (Yorkshire).

Turning now to the autumn movements, easily the most interesting record was an immature **White-tailed Eagle** (*Haliaëtus albicilla*) at Selsey Bill (Sussex) on 30th July. In this connection it is worth adding that we have also received preliminary details of an eagle at Branscombe (Devon) on 28th July. A **Kite** (*Milvus milvus*), possibly a young bird, appeared over Boars Hill (Berkshire) on 27th July and soon after, in early August, southern England had its first **Ospreys** (*Pandion haliaëtus*) of the autumn. Ospreys again reared three young at Loch Garten (Inverness-shire).

SMALLER LAND BIRDS

At the time of writing, there have not been many reports of unusual Passerines in August, though an **Aquatic Warbler** (*Acrocephalus paludicola*) was seen at Theale (Berkshire) on 2nd August and a **Great Reed Warbler** (*A. arundinaceus*) at Slapton Ley (Devon) on the 7th, while the first of the autumn's **Icterine Warblers** (*Hippolais icterina*), a young bird, was ringed at Minsmere (Suffolk) on the 12th. One or two **Hoopoes** (*Upupa epops*) were reported from southern counties and as far north as Derbyshire in late July and early August, without there being any real influx.

As a continuation of our last summary (pages 295-296), however, two more **Woodchat Shrikes** (*Lanius senator*) were subsequently reported for the late May/early June period—single adults at St. Agnes (Isles of Scilly) on 27th May and Dungeness (Kent) on 11th June. There was also another **Lesser Grey Shrike** (*L. minor*), an adult male near Scarborough (Yorkshire) for at least three weeks from 4th July. A male **Serin** (*Serinus canarius*) was identified at Slimbridge (Gloucestershire) on 13th and 16th July, and the year's long list of male **Red-headed Buntings** (*Emberiza bruniceps*) was further increased by appearances at Dungeness on 10th June and at Keyhaven Marshes (Hampshire) on 2nd July.

The spread of the **Collared Dove** (*Streptopelia decaocto*) continues and this year the species has nested in such widely scattered counties as Dorset and Cornwall, Nottingham and Lancashire, apart from the eastern districts where breeding is now well established.

In conclusion, it is worth looking at the effects of the summer on the Passerine breeding season, which in turn affects the autumn picture. The prolonged spell of dry weather in May and June had widely differing results. Some of the resident finches and those summer visitors which feed on flying insects—**Hirundines,**

Swifts (*Apus apus*), **Spotted Flycatchers** (*Muscicapa striata*) and so on—seem to have done well. But other species, such as warblers and tits, which rely on the caterpillar crop to feed their young, had a very poor time in the drought and many broods died in the nest. Reports of this came from a number of counties as far apart as Durham, Gloucester and Kent and we should be glad to receive any similar records. Two examples from the first group, the successful species, will serve to show how this has shown up in the autumn picture. Firstly, **Sand Martins** (*Riparia riparia*) began to move south in force as early as the second week of July, reaching a peak about the 16th/17th. At Romford (Essex) this passage was considered to be about ten days early and two out of a large number of young Sand Martins trapped on the 17th were found to be carrying rings put on them as nestlings in Nottingham and Yorkshire, the latter only eleven days earlier. Secondly, the size of the late summer population of **Goldfinches** (*Carduelis carduelis*) attracted comment in many parts of East Anglia and south-east England.

Notice

Possible charter flight to America for XIII International Ornithological Congress.—The cost of travel to the United States may cause a major reduction in the European attendance at the XIII International Ornithological Congress at Cornell University in June 1962 (for details see *Brit. Birds*, May 1961, page 212), unless a charter flight can be organised. Plans to charter an aircraft are in hand and if this becomes possible there will be a saving of about 50% in the air fare. However, these plans cannot be finalised unless the organisers are assured in advance that they can fill all the seats. It is important, therefore, that those who are interested should inform the travel agency concerned *within the next month*. At this stage no financial commitment need be made, but the organisers are anxious to compile a provisional list and will later give full details to those interested so that they can take firm decisions. The flight will be organised on the basis of a round trip of either two or three weeks, in order to enable those attending the Congress to take part in some of the excursions. Communications concerning the charter flight should be addressed to "13th International Ornithological Congress 1962", P.O. Box 845, W.D.O., London, W.1.

Requests for information

Colour-ringed Black-headed Gulls.—As part of a population and behavioural study of the Black-headed Gull (*Larus ridibundus*), 1,500 juveniles were marked in June 1961, at Ravenglass, Cumberland, with a black plastic ring on the left leg and a metal ring on the right. Anybody who sees one of these birds is asked to send details of date and locality to I. J. Patterson, Department of Zoology and Comparative Anatomy, University Museum, Oxford.

Colour-ringed Dunlins.—In an attempt to investigate the migrations of the Dunlin (*Calidris alpina*), the Ornithological Club of Uppsala is marking all birds of this species trapped between July and mid-September 1961 at Ledskär, Sweden (60° 30'N, 17°45'E), with a coloured ring on one leg and a numbered one on the other. Anybody seeing one anywhere is particularly asked to note not only the colour of the coloured ring, but also which leg it is on. Details of date and locality—with, if possible, the time of day and any information on the number of other Dunlins present and their length of stay—should be sent to Sven Uhlin, Gnejsvägen 3 B, Uppsala, Sweden. This project will be continued for several years and it will be much appreciated if readers will draw the attention of their friends to it.

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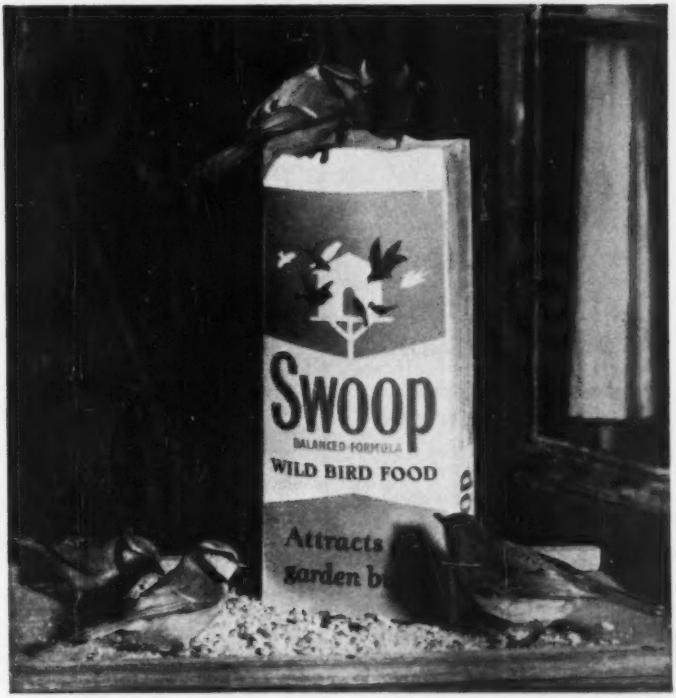

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Contributors are asked to observe the following points, attention to which saves the waste of much editorial time on trivial alterations:

1. Papers should be typewritten with double spacing, and on one side of the sheet only. Shorter contributions, if not typed, must be clearly written and with similar spacing. Failure to help in this way may result in delays to publication.

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